mikroMMB for dsPIC33™

User manual

All MikroElektronika´s development systems represent irreplaceable tools for programming and developing microcontroller-based devices. Carefully chosen components and the use of machines of the last generation for mounting and testing thereof are the best guarantee of high reliability of our devices. Due to simple design, a large number of add-on modules and ready to use examples, all our users, regardless of their experience, have the possibility to develop their project in a fast and efficient way.

Development system

MikroElektronika
SOFTWARE AND HARDWARE SOLUTIONS FOR EMBEDDED WORLD ...making it simple

TO OUR VALUED CUSTOMERS

I want to express my thanks to you for being interested in our products and for having confidence in Mikroelektronika.
The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic
General Manager

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General information

The *mikroMMB for dsPIC33* is a compact development system which provides a convenient platform for development of devices with multimedia contents. The central part of the system is a 16-bit microcontroller dsPIC33FJ128GP710 that is programmed with the LV24-33 external programmer from Mikroelektronika or with ICD2® and ICD3® programmers from Microchip®. The *mikroMMB for PIC33* features integrated modules such as audio module, TFT 320x240 touch screen display, USB connector for communication with the microcontroller, flash memory and MMC/SD card connector.

dsPIC33 MultiMedia BOARD — Multimedia board may be used as a stand-alone control device

TFT 320X240 Display — TFT 320X240 display with a palette of 262.000 colors is used to display graphic contents

TOUCHSCREEN — Touch panel is part of TFT display. Together they form a touch screen module

MMC/SD MEMORY CARD — The possibility of reading MMC/SD memory cards

The microcontroller is programmed with the relevant program that comes along with the external programmer you choose. The programmer is ordered separately from the development system.

Package contains:

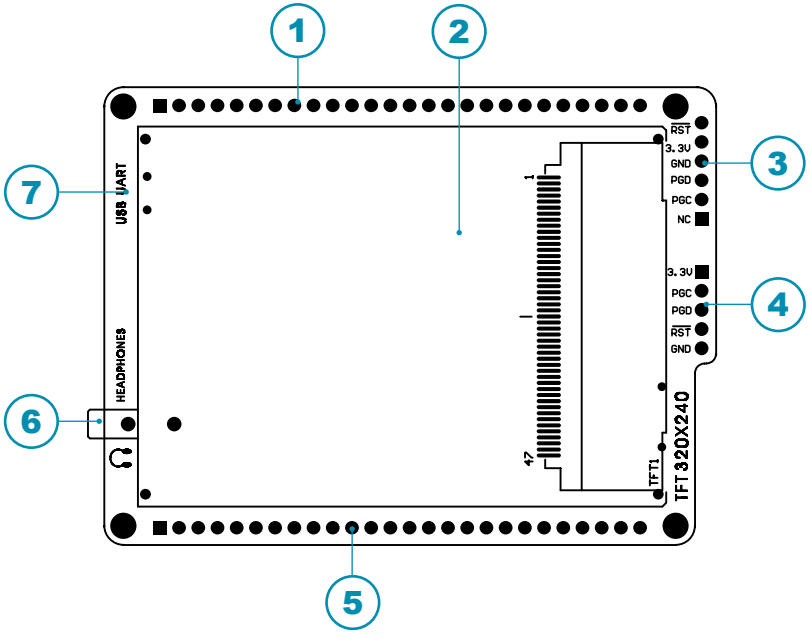
Development system:	mikroMMB for PIC33
CD:	product CD with the relevant software
Cables:	USB cable
Documentation:	mikroMMB for PIC33 manual

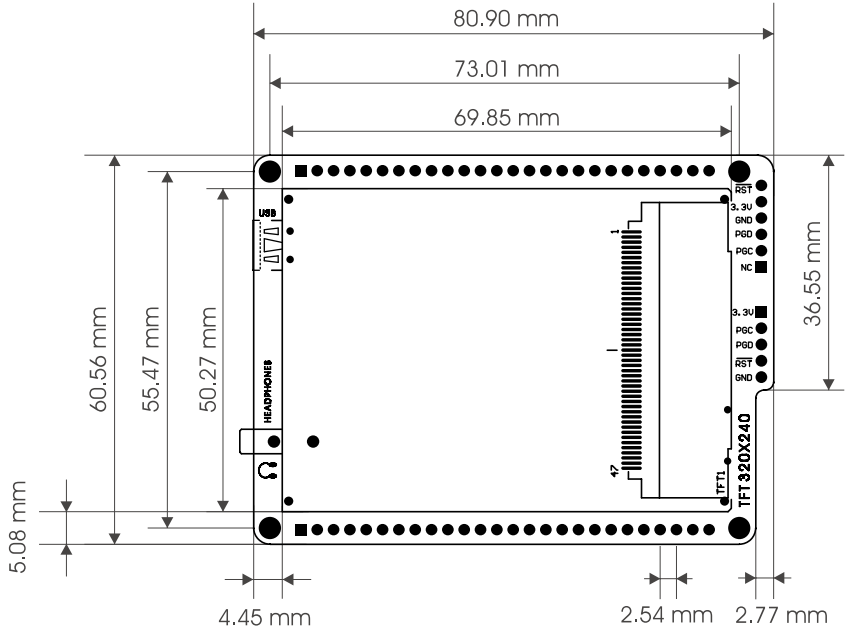
System Specification:

Power supply:	over a USB cable (5V DC)
Power consumption:	50mA in idle state (when on-board modules are off)
Dimensions:	8 x 6cm (3.14 x 2.36 inch)
Weight:	~150g (0.33 lbs)

Key features

1. Pads
2. TFT 320x240 display
3. Pads used to connect ICD2 and ICD3 programmers
4. Pads used to connect the LV24-33 programmer
5. Pads
6. Headphone connector
7. USB MINI-B connector





1.0. Development system connection

Connect the development system to a PC via a USB cable, Figure 1-1. The TFT display will be automatically turned on.

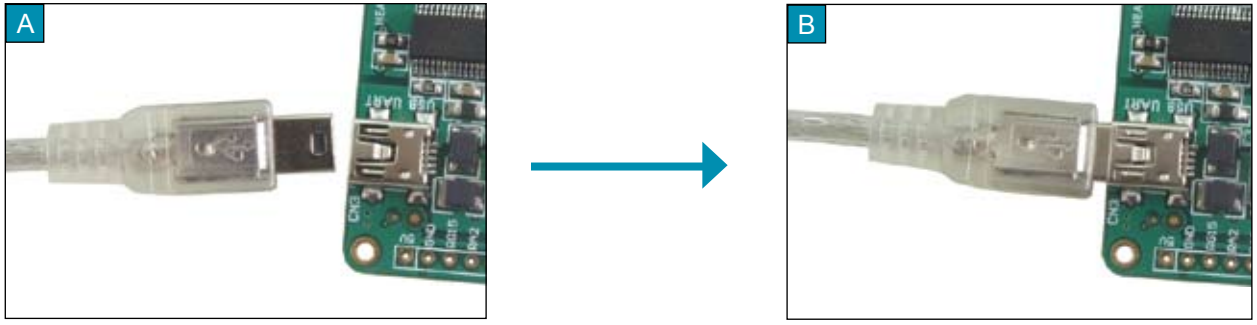


Figure 1-1: Powering the development system

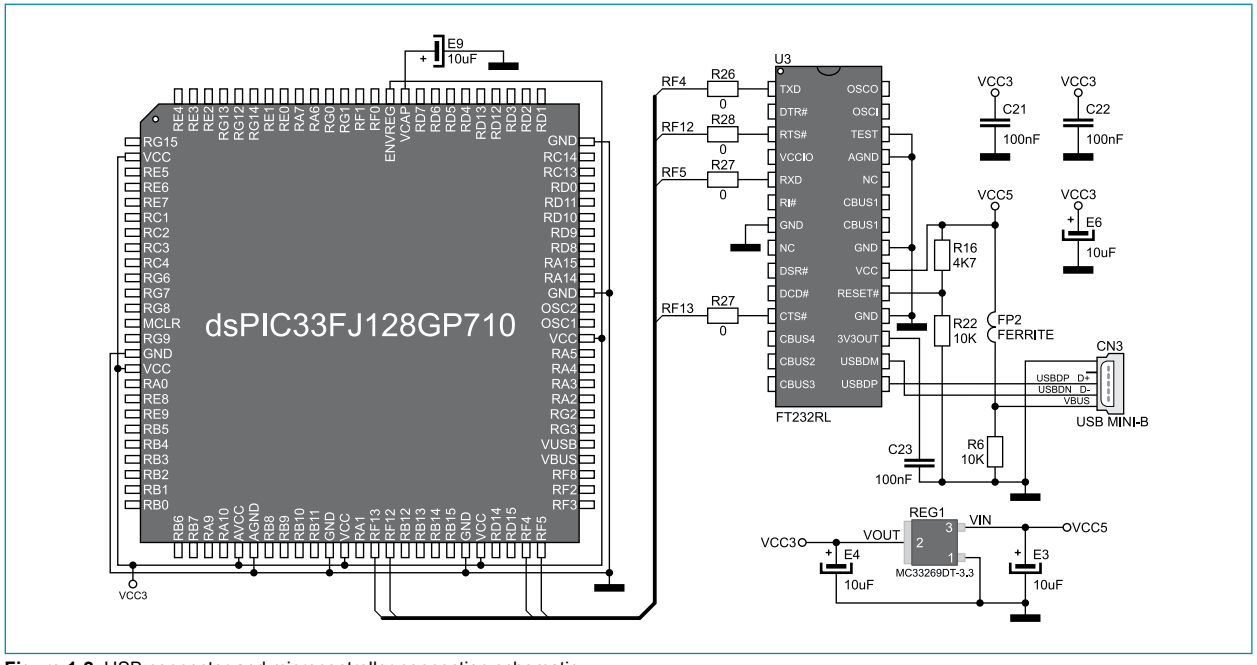


Figure 1-2: USB connector and microcontroller connection schematic

The USB connector is used to access the UART2 module built into the microcontroller.

2.0. dsPIC33FJ128GP710 microcontroller

The *mikroMMB for PIC33* development system comes with the dsPIC33FJ128GP710 microcontroller. This high-performance 16-bit microcontroller with its integrated modules and in combination with other on-board modules is ideal for multimedia applications.

Key features of the microcontroller:

- Up to 40 MIPS Operation;
- 16-bit wide data path
- 24-bit wide instructions
- Linear program memory addressing up to 4M instruction words
- Linear data memory addressing up to 64 Kbytes
- 83 base instructions: mostly 1 word/1 cycle
- Sixteen 16-bit General Purpose Registers; etc.

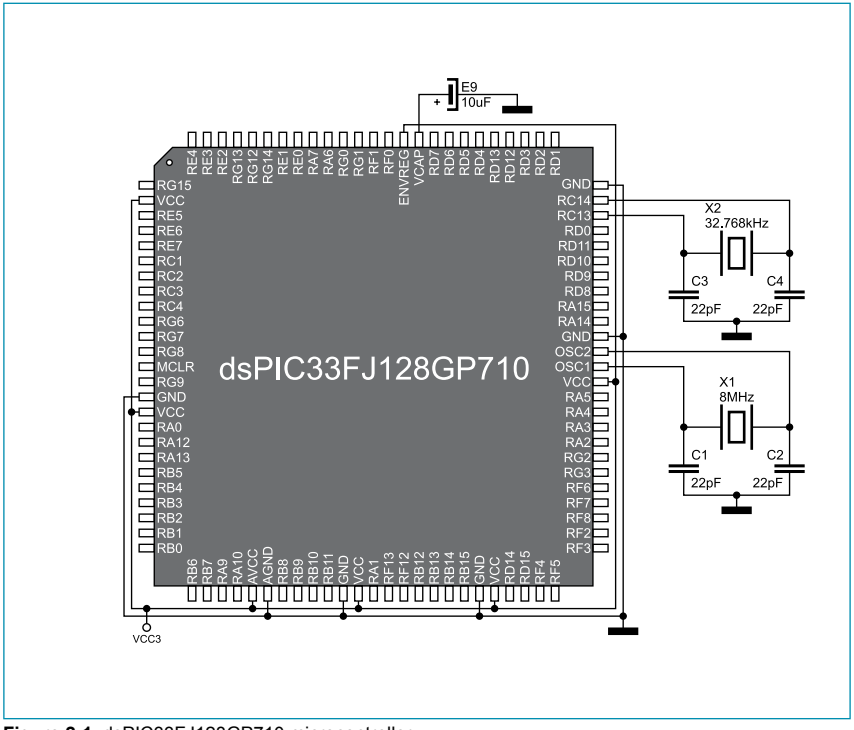


Figure 2-1: dsPIC33FJ128GP710 microcontroller

Pads (HDR1 and HDR2) are used for connecting the microcontroller pins to some additional device or a proto board. These pads are placed along the two opposite sides of the development system.

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3.0. dsPIC33FJ128GP710 microcontroller programming

The microcontroller is programmed with LV24-33, ICD2® or ICD3® programmer. The LV24-33 programmer is connected to the development system via the CN1 connector, Figure 3-2. The CN9 connector is used to connect ICD2 and ICD3 programmers, Figure 3-4.

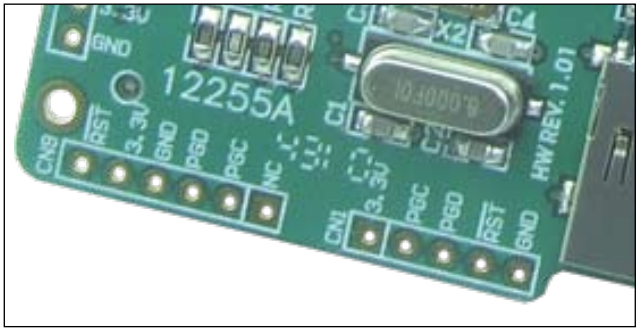

Figure 3-1: CN9 and CN1 connectors

In order to connect the LV24-33 programmer to the development system, it is necessary to provide a 1x5 connector that should be soldered on the CN1 connector. When plugging in the programmer's IDC10 connector, make sure that connector pins MCU RB6 (PGC), MCU RB7 (PGD) and MCU MCLR are plugged into the CN1 connector, Figure 3-3.

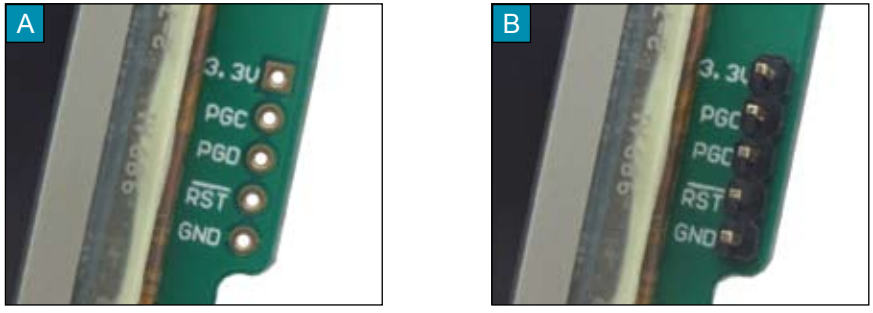

Figure 3-2: Soldering 1x5 connector

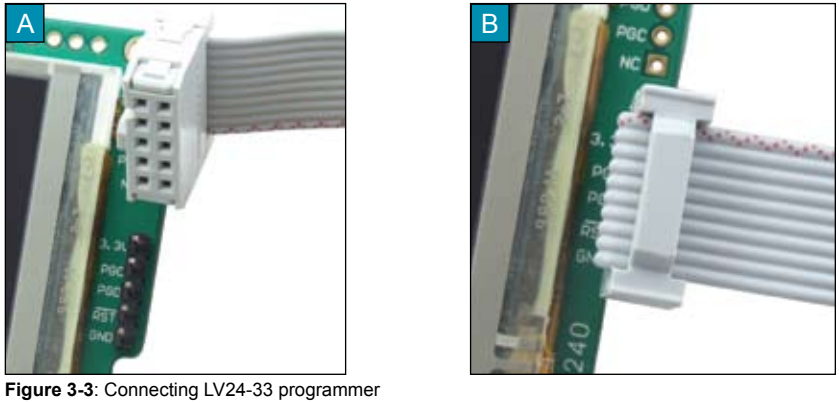

Figure 3-3: Connecting LV24-33 programmer

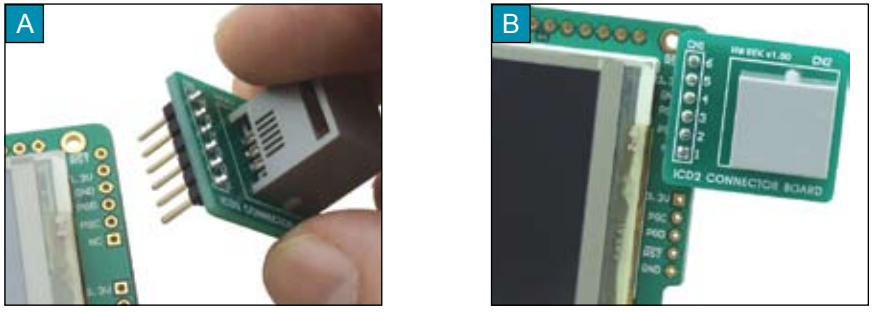

Figure 3-4: Connecting ICD2 connector

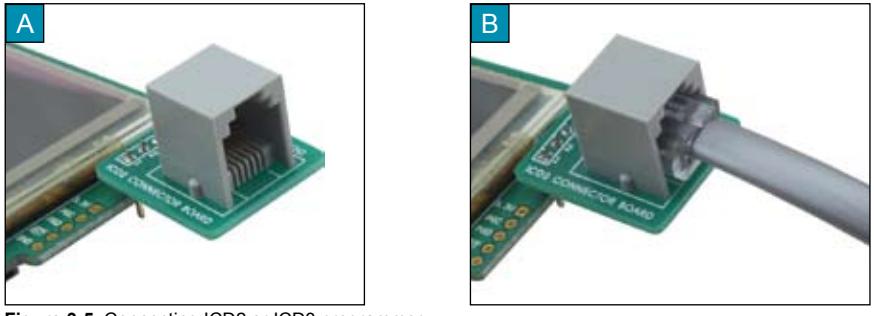

Figure 3-5: Connecting ICD2 or ICD3 programmer

In order to enable the ICD2 and ICD3 programmers to be connected to the development system, it is necessary to provide the appropriate connector such as the ICD2 CONNECTOR BOARD. This connector should be first soldered on the CN9 connector, Figure 3-4. Then you should plug in the ICD2 or ICD3 programmer into it, Figure 3-5.

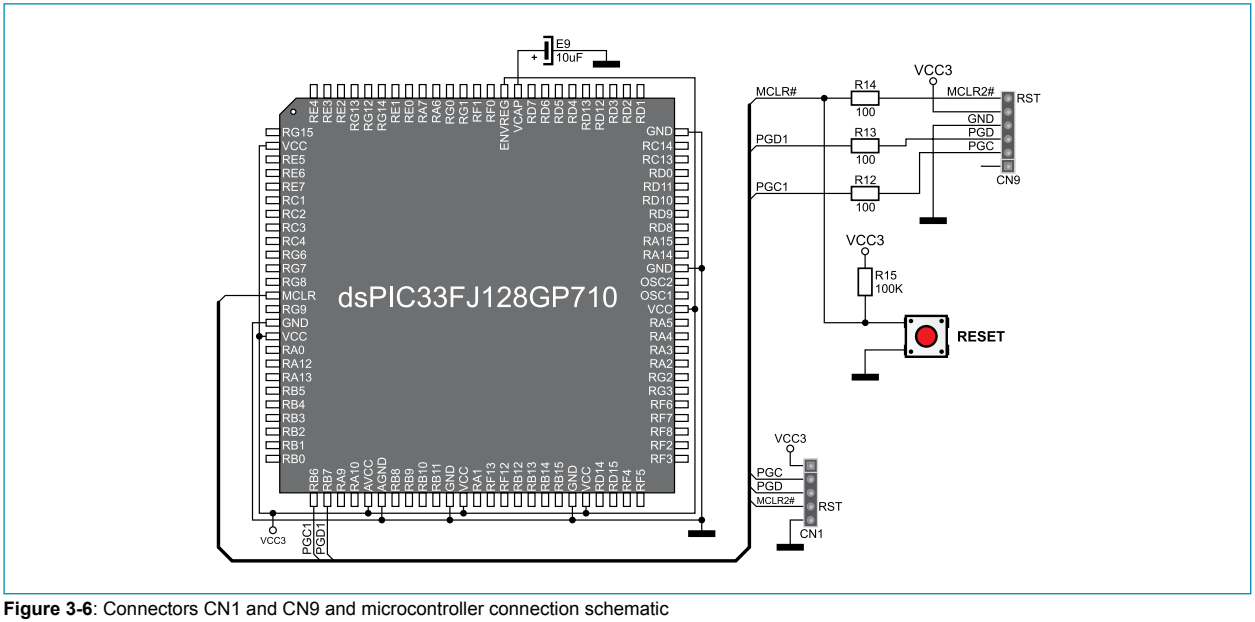

Figure 3-6: Connectors CN1 and CN9 and microcontroller connection schematic

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4.0. Touch screen

The development system features a TFT 320x240 display covered with a sensitive touch panel. Together they form a functional unit called a touch screen. It enables data to be entered and displayed at the same time. The way of entering and displaying data depends on the program loaded into the microcontroller. The TFT display is capable of showing data in 262.000 different colors.

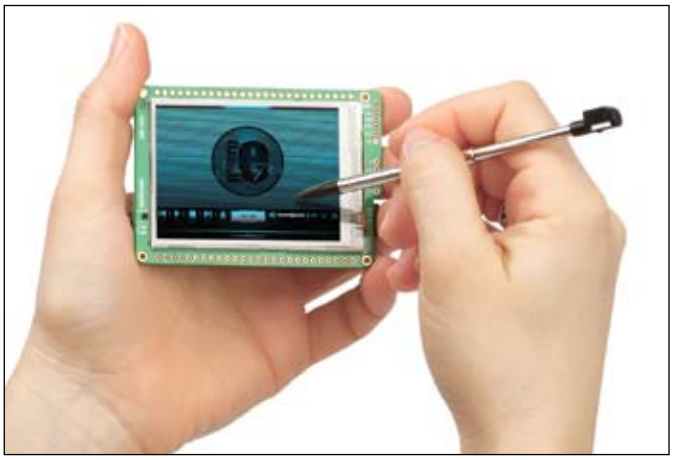

Figure 4-1: Touch screen

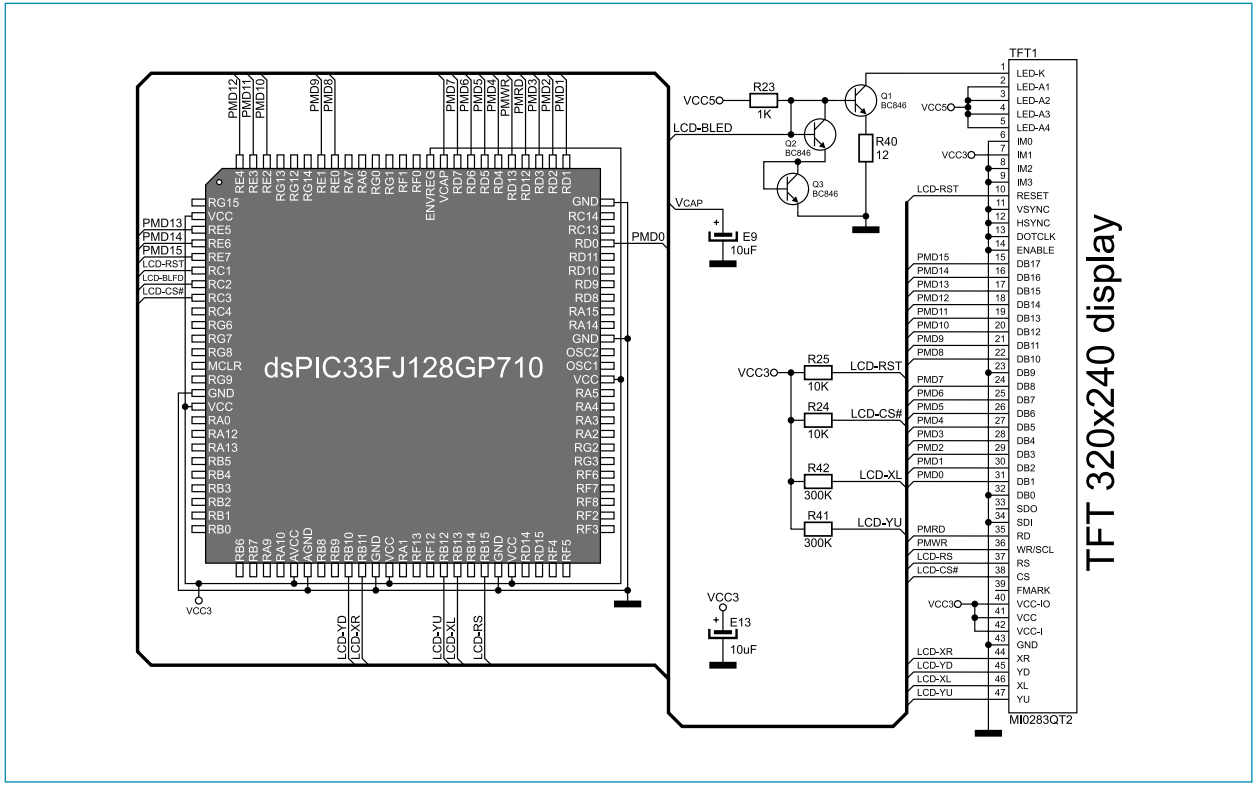

Figure 4-2: Touch screen connection schematic

5.0. Flash memory module

Since multimedia applications are getting increasingly demanding, it is necessary to provide additional memory space to be used for storing programs by the microcontroller. The flash memory module enables the microcontroller to use additional 8Mbit flash memory. It is connected to the microcontroller via the Serial Peripheral Interface (SPI).

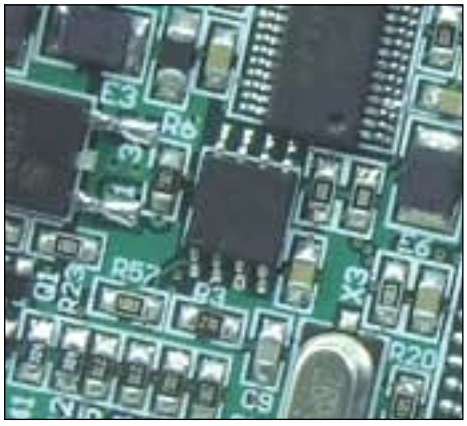

Figure 5-1: Flash memory module

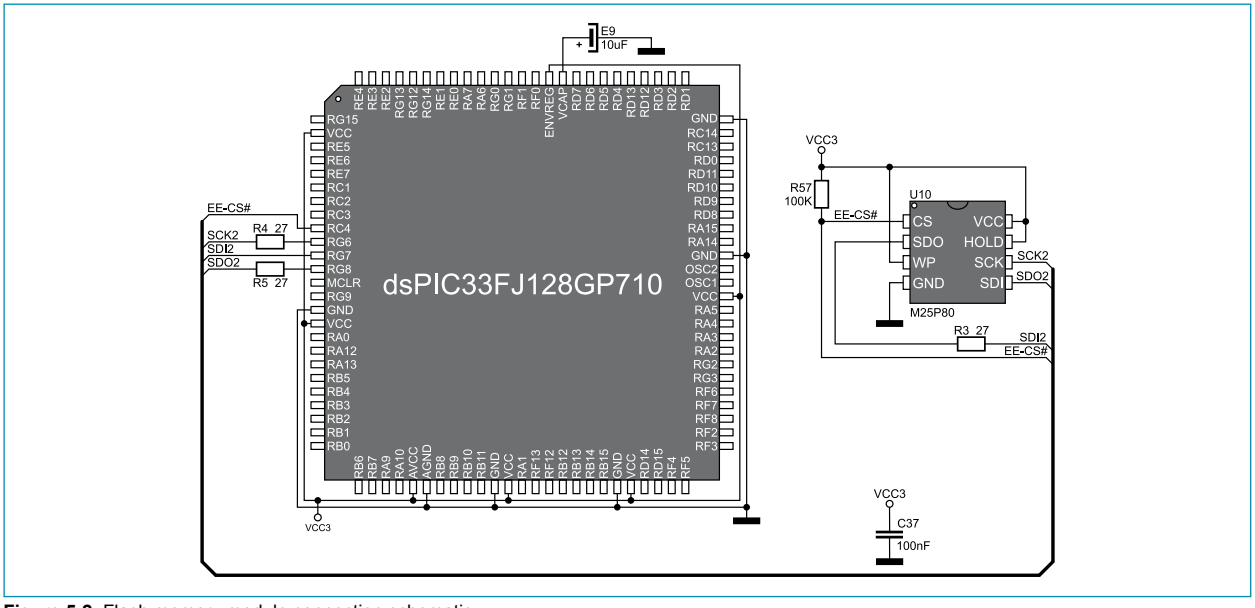

Figure 5-2: Flash memory module connection schematic

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6.0. MMC/SD connector

There is a built-in MMC/SD connector for MMC/SD cards provided on the development system. It enables the system to additionally expand available memory space. The Serial Peripheral Interface (SPI) is used for communication between the microcontroller and MMC/SD card.

Figure 6-1: Inserting MMC/SD card

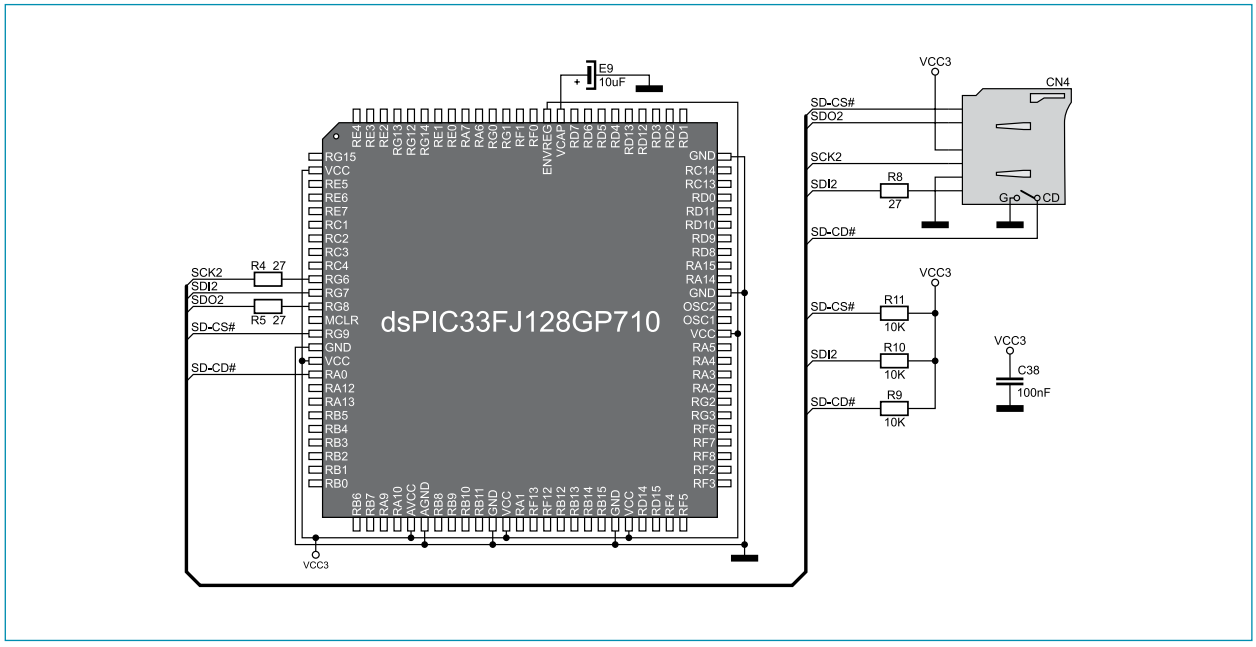

Figure 6-2: MMC/SD connector and microcontroller connection schematic

7.0. Audio module

The *mikroMMB for PIC33* features an audio module providing an interface for stereo headphones.This module enables audio reproduction by using stereo headphones connected to the system via a 3.5mm connector CN6. Volume as well as other functions of this module are controlled by the microcontroller from within the software using the Serial Peripheral Interface (SPI). Communication between the audio module and the microcontroller is performed via the Serial Peripheral Interface (SPI).

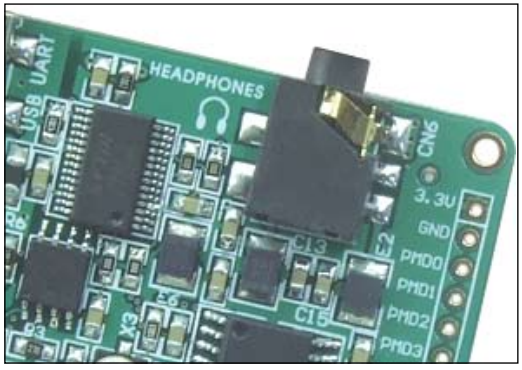

Figure 7-1: Audio connectors

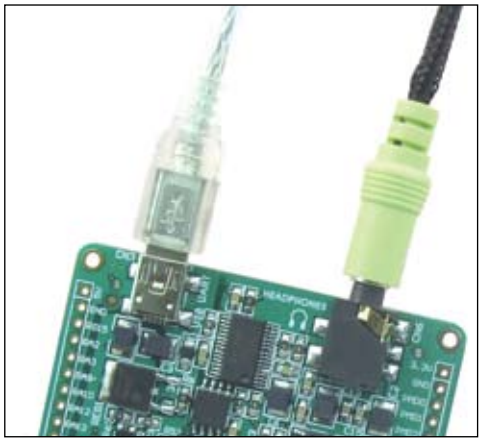

Figure 7-2: Audio connector with headphones connected

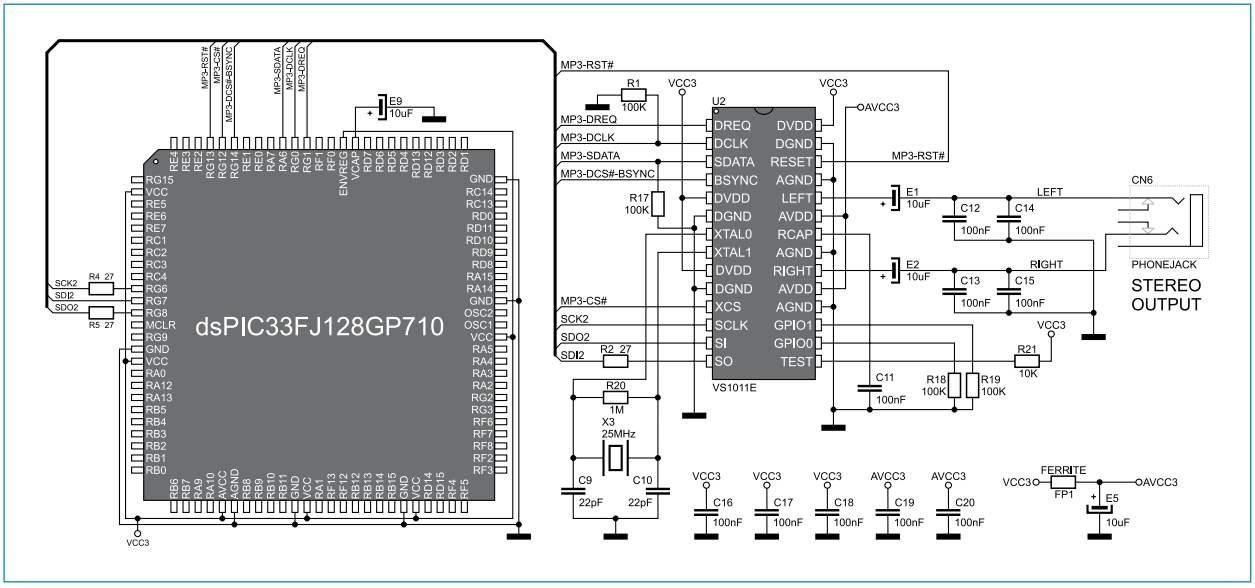

Figure 7-3: Audio module connection schematic

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8.0. Pads

The access to the microcontroller pins on the development system is enabled via pads provided along the two long sides of the development system.

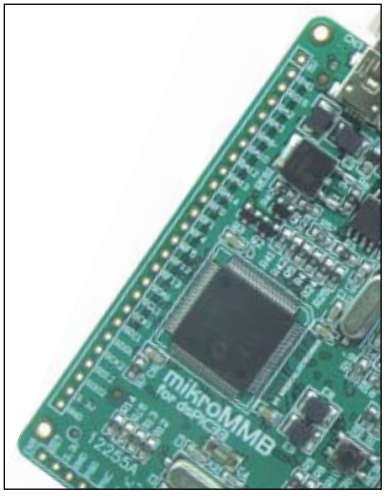

Figure 8-1: Pads

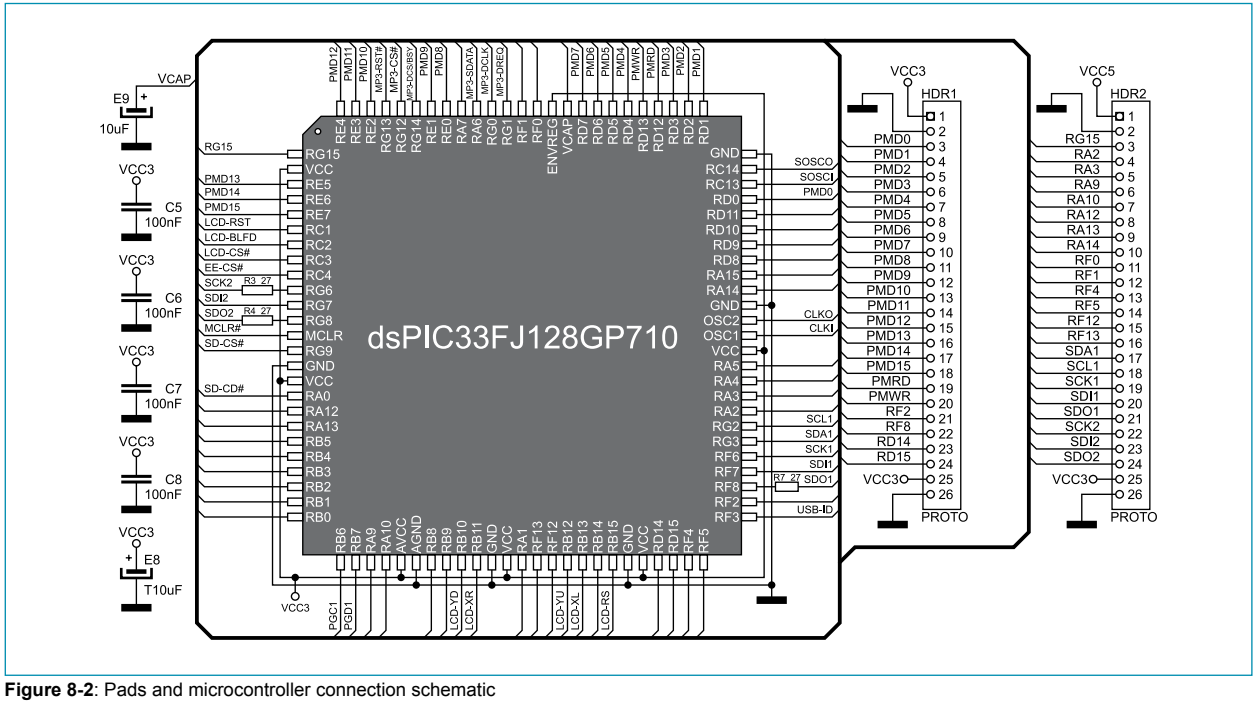

Figure 8-2: Pads and microcontroller connection schematic

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HIGH RISK ACTIVITIES

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